CLAIMS

1. Apparatus for adding wavelengths to a WDM signal, said apparatus comprising:

a first optical device that combines input to P input ports into a single output signal, each of said P input ports accepting non-overlapping interleaved sets of N/P wavelengths wherein P is greater than one and N is a total number of wavelengths accepted by said P input ports; and

a second optical device that combines said signal output signal with said WDM signal.

2. The apparatus of claim 1 wherein said first optical device comprises a cyclic AWG.

3. The apparatus of claim 1 wherein said first optical device comprises an optical interleaver.

4. The apparatus of claim 1 wherein N is a total number of wavelengths of a wavelength grid of a WDM communication system carrying said WDM signal.

5. The apparatus of claim 1 wherein optical energy is present at all of said P input ports.

6. The apparatus of claim 1 wherein optical energy is not present at at least one of said P inputs.

7. The apparatus of claim 1 further comprising:

an optical combination structure providing an output signal to exactly one of said P inputs of said first optical device and having exactly N/P inputs that are combined to form said output signal.

8. The apparatus of claim 7 wherein said optical combination structure comprises a thin film filter.

9. The apparatus of claim 7 wherein said optical combination structure comprises a polarization beam combiner.

10. The apparatus of claim 1 further comprising:

an optical combination structure providing an output signal to exactly one of said P inputs of said first optical device and having less than N/P inputs that are combined to form said output signal.

11. The apparatus of claim 1 wherein said optical combination structure comprises a polarization beam combiner.

12. Apparatus for dropping wavelengths from a WDM signal in a WDM communication system employing a WDM grid having N wavelengths, said apparatus comprising:

a first optical device that taps off a portion of said WDM signal; and

a second optical device that receives said tapped off portion of said WDM signal as input and outputs non-overlapping interleaved sets of N/P wavelengths via each of P output ports.

13. The apparatus of claim 12 wherein said second optical device comprises a cyclic AWG.

14. The apparatus of claim 12 wherein said second optical device comprises an optical deinterleaver.

15. The apparatus of claim 12 further comprising:

a third optical device connected to one of said P output ports.

16. The apparatus of claim 15 wherein said third optical device comprises a thin film filter.

17. The apparatus of claim 12 further comprising:

a cascaded series of filters connected to one of said P output ports, each one of said cascaded series selecting a single wavelength for output.

18. The apparatus of claim 12 further comprising:

a splitter connected to one of said P output ports.

19. The apparatus of claim 18 wherein said splitter has N/P outputs.

20. The apparatus of claim 18 wherein said splitter has fewer than N/P outputs.

21. A method for adding wavelengths to a WDM signal, said method comprising:

inputting optical energy to at least one of P inputs of a first optical device each of said P input ports accepting non-overlapping interleaved sets of N/P wavelengths wherein P is greater than one and N is a total number of wavelengths accepted by said P input ports;

combining said optical energy input to said at least one of P inputs and outputting said combined optical energy from said first optical device; and

combining said combined optical energy with said WDM signal.

22. The method of claim 21 wherein said first optical device comprises a cyclic AWG.

23. The method of claim 21 wherein said first optical device comprises an optical interleaver.

24. The method of claim 21 wherein N is a total number of wavelengths of a wavelength grid of a WDM communication system carrying said WDM signal.

25. The method of claim 21 wherein optical energy is input to all of said P input ports.

26. The method of claim 21 further comprising:

providing an optical combination structure that combines a plurality of single wavelength signals into input for one of said P input ports of said first optical device.

27. The method of claim 26 wherein said plurality of single wavelength signals comprises exactly N/P single wavelength signals.

28. The method of claim 26 wherein said plurality of single wavelength signals comprises less than N/P single wavelength signals.

29. A method for dropping wavelengths from a WDM signal in a WDM communication system employing a WDM grid having N wavelengths, said method comprising:

tapping off a portion of said WDM signal; and

directing said tapped-off portion to an optical device that receives said tapped off portion of said WDM signal as input and outputs non-overlapping interleaved sets of N/P wavelengths via each of P output ports.

30. The method of claim 29 wherein said optical device comprises a cyclic AWG.

31. The method of claim 29 wherein said optical device comprises an optical deinterleaver.

32. The method of claim 29 further comprising:

directing output of one of said P output ports to input of a splitter having N/P outputs.

33. The method of claim 32 further comprising:

for each of said N/P outputs, providing an optical filter to select a single wavelength.

34. The method of claim 29 further comprising:

directing output of one of said P output ports to input of a splitter having less than N/P outputs.

35. The method of claim 34 further comprising:

for each of said less than N/P outputs, providing an optical filter to select a single wavelength.

36. The method of claim 29 further comprising:

directing output of one of said P output ports to an optical filter that selects a single wavelength.

37. Apparatus for adding wavelengths to a WDM signal, said apparatus comprising:

means for inputting optical energy to at least one of P inputs of a first optical device each of said P input ports accepting non-overlapping interleaved sets of N/P wavelengths wherein P is greater than one and N is a total number of wavelengths accepted by said P input ports;

means for combining said optical energy input to said at least one of P inputs and outputting said combined optical energy from said first optical device; and

means for combining said combined optical energy with said WDM signal.

38. Apparatus for dropping wavelengths from a WDM signal in a WDM communication system employing a WDM grid having N wavelengths, said apparatus comprising:

means for tapping off a portion of said WDM signal; and

means for directing said tapped-off portion to an optical device that receives said tapped off portion of said WDM signal as input and outputs non-overlapping interleaved sets of N/P wavelengths via each of P output ports.